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EDITORIAL

Maternal food intake and socioeconomic status to tackle childhood malnutrition^{☆,☆☆}



Alimentação maternal e status socioeconômico na luta contra a má-nutrição infantil

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This issue features a study by Géa-Horta et al.,¹ which describes the association between maternal socioeconomic factors (employment and level of schooling) and the occurrence of some nutritional indicators (short stature and excess weight) in children under 5 years of age in a representative sample of the Brazilian population. The final sample comprised 4356 women with a mean age of 27 years and their respective children, with a mean age of 2 years, 52% of whom were males. Maternal employment rate was 40% and the mothers had a mean of 8 years of schooling. The children had a lower mean height/age than the international standards, while the body mass index (BMI)/age ratio was higher.²

One of the main results of this study was the four-fold higher chance of mothers with low maternal level of schooling to have children with short stature (height/age below –2 standard deviations). This association may be explained by a less favorable socioeconomic status, either reflecting the reduced possibility of acquiring healthy foods, or due to the lower awareness of the role of food in the future

development of the offspring. The first reason probably prevails, since there was no association between maternal level of schooling and excess weight, similarly to other studies.

This study indicated that children whose mothers were employed were 57% more likely to be overweight (BMI/age >2 standard deviations) when compared with children with unemployed mothers or who worked at home. However, employability had no impact on the children's height, as shown by other studies. Thus, on the one hand, maternal employment benefits the child's growth due to the greater access to food and health services, which are facilitated by a higher income. On the other hand, it deprives the child of full-time maternal care, particularly for the preparation of healthy meals and performance of leisure activities, in addition to the fact that it can be a barrier to breastfeeding.

The origin of the analyzed data – the National Survey on Children and Women's Demographics and Health 2006–2007 – reinforces the external validity of the results, as it is a representative sample of that population, but limits their quality, because some confounding variables were not controlled, such as the children's activity levels, breastfeeding duration, maternal weight gain, and birth weight, among others.

This study reinforces the concept that in several geographical areas, such as in Brazil, disconcerting prevalence rates of obesity and malnutrition still coexist. It also suggests that the definition and implementation of public health

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policies aiming to decrease these rates must consider the socioeconomic factors. It is noteworthy the improvement in some parameters, such as basic sanitation conditions, access to health care, and *per capita* income, which have improved some nutritional indicators. However, the new dynamics of societies regarding work, with the increase of maternal employment in countries with less social welfare, raise considerable challenges, particularly in ensuring healthcare access to families before and after the child's birth, which can be translated into better maternal-fetal environment, immediately reflected in birth weight and the many associated factors, such as the acquired human capital, risk factors for diseases, and even problematic eating behaviors.

In a study by Oliveira et al.³ in three European birth cohorts (Generation XXI, from Portugal; ALSPAC, from the United Kingdom; and EDEN, from France), the reports on difficulties when feeding children, such as eating small amounts or need for stimulation to eat, were significantly more frequent in those born small for gestational age.

In Portugal, the study on the birth cohort Generation XXI disclosed other levels of influence that require urgent intervention to obtain good results in relation to nutritional status and food intake up to 4 years of age.

In the study by Durão et al.,⁴ in a subsample of 3422 mothers and their children, the influence of family characteristics was analyzed, including behaviors and lifestyle (physical activity, smoking, and eating habits of mothers and children), on the dietary patterns of children at 4 years of age, conceptualizing this action according to a sociodemographic model with four levels (socioeconomic status of the mother at 12 years of age, maternal socioeconomic status and sociodemographic characteristics at the child's birth, family characteristics at 4 years of age of the child, and maternal characteristics and behaviors at 4 years of age of the child). It was verified that a worse maternal socioeconomic status at 12 years of age and low maternal level of schooling were associated with worse dietary patterns, represented by the consumption of foods that are low in micronutrients and with high energy density (low socioeconomic status at 12 years of age *versus* high, OR = 1.76, 95% CI: 1.42–2.18; maternal level of schooling ≤ 9 years *versus* > 12 years, OR = 2.19, 95% CI: 1.70–2.81). Children whose mothers had a worse diet quality were significantly more likely to have an unhealthy eating pattern, especially of foods low in micronutrients and with high energy density (first quartile of lower maternal food quality *versus* fourth quartile of reference of higher-quality maternal food, OR = 9.94, 95% CI: 7.35–13.44, *p*-trend < 0.001 after adjusting for confounders). In this same cohort, the analysis of infant feeding practices through a questionnaire validated for Portugal⁵ and combining the scales of the Child Feeding Questionnaire by Birch et al.⁶ and of overt and covert control by Ogden et al.⁷ showed that higher levels of maternal monitoring and restriction of intake were inversely associated with the occurrence of inadequate dietary patterns in children, such as the intake of high-energy density foods (respectively, OR = 0.84, 95% CI: 0.77–0.91 and OR = 0.85, 95% CI: 0.78–0.93). That is, in the group of studied factors, maternal nutrition appears to be a key factor associated with the child's diet at 4 years of age, far above the socioeconomic, demographic, and education factors, and dietary behavior, contributing with approximately one-third of the

determination coefficient (Nagelkerke's R^2) in the adjusted model.

Once the tracking of dietary habits is known, from the growth period to adulthood, and the importance that children's eating behaviors might have during the first years of life for future food intake, it is essential to produce tools and studies with approaches capable of defining the behaviors in their different dimensions and their impact on nutritional status.⁸ In a study on the eating behaviors in three European cohorts (Generation XXI, from Portugal; ALSPAC, from the United Kingdom; and EDEN, from France), children who exhibited greater difficulty in ingesting food, food refusal/neophobia, and difficulties in establishing a daily intake routine at 12–15 months, 24, and 48–54 months of age had a lower fruit and vegetables intake.⁹ The importance of eating behaviors in food inadequacy in children aged 4 years was demonstrated in the XXI Generation cohort, which showed that maternal practices such as pressure (at an appropriate level) and an overt control over what is eaten may be associated with more adequate consumption of fruit, vegetables, and dairy products.¹⁰ The possibility that there can be bidirectional effects between infant feeding practices and children's BMI should be considered; awareness of this phenomenon can improve the knowledge of the parental role in the child's nutritional status and childhood obesity. The results are also difficult to interpret when, for instance, in an experimental environment, restriction is identified as a factor that can cause excessive food intake,¹¹ although in longitudinal studies, restriction may¹² or may not demonstrate an effect on the child's feeding behavior¹³ or BMI.¹⁴ Conversely, body weight can also influence the feeding behavior, as a tendency to greater restrictions and lower levels of pressure to eat at 4 years of age¹⁴ have been described in parents of children with higher BMI at 2 years of age. In the study by Afonso et al.¹⁵ in the Generation XXI cohort, the longitudinal study of the bidirectional associations between infant feeding practices and BMI at 4–7 years of age showed that the parents' practices respond to the child's weight, but the child's weight also influence them. Thus, pressure to eat and more overt control of nutrition at 4 years of age were significantly associated with a lower BMI at age 7, while a higher BMI at 4 years of age was associated with higher levels of restriction and covert control of nutrition.

Therefore, it appears evident to favor the intervention at the pre-school age in groups that combine the characteristics of poor maternal nutrition and low socioeconomic status. The battle against child malnutrition will be a long one, but it can no longer be postponed.

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Géa-Horta T, Felisbino-Mendes MS, Ortiz RJ, Velasquez-Melendez G. Association between maternal socioeconomic factors and nutritional outcomes in children under 5 years of age. *J Pediatr (Rio J)*. 2016;92:574–80.

2. WHO Multicentre Growth Reference Study Group. WHO Child Growth Standards based on length/height, weight and age. *Acta Paediatr Suppl.* 2006;450:76–85.
3. Oliveira A, de Lauzon-Guillain B, Jones L, Emmett P, Moreira P, Ramos E, et al. Birth weight and eating behaviors of young children. *J Pediatr.* 2015;166:59–65.
4. Durão C, Severo M, Oliveira A, Moreira P, Guerra A, Barros H, et al. Association of maternal characteristics and behaviours with 4-year-old children's dietary patterns. *Matern Child Nutr.* 2016, <http://dx.doi.org/10.1111/mcn.12278> [Epub ahead of print].
5. Real H, Oliveira A, Severo M, Moreira P, Lopes C. Combination and adaptation of two tools to assess parental feeding practices in pre-school children. *Eat Behav.* 2014;15:383–7.
6. Birch LL, Fisher JO, Grimm-Thomas K, Markey CN, Sawyer R, Johnson SL. Confirmatory factor analysis of the Child Feeding Questionnaire: a measure of parental attitudes, beliefs and practices about child feeding and obesity proneness. *Appetite.* 2001;36:201–10.
7. Ogden J, Reynolds R, Smith A. Expanding the concept of parental control: a role for overt and covert control in children's snacking behaviour? *Appetite.* 2006;47:100–6.
8. de Lauzon-Guillain B, Oliveira A, Charles MA, Grammatikaki E, Jones L, Rigal N, et al. A review of methods to assess parental feeding practices and preschool children's eating behavior: the need for further development of tools. *J Acad Nutr Diet.* 2012;112:1578–602, 1602.e1–8.
9. Oliveira A, Jones L, de Lauzon-Guillain B, Emmett P, Moreira P, Charles MA, et al. Early problematic eating behaviours are associated with lower fruit and vegetable intake and less dietary variety at 4–5 years of age. A prospective analysis of three European birth cohorts. *Br J Nutr.* 2015;114:763–71.
10. Durão C, Andreozzi V, Oliveira A, Moreira P, Guerra A, Barros H, et al. Maternal child-feeding practices and dietary inadequacy of 4-year-old children. *Appetite.* 2015;92:15–23.
11. Fisher JO, Birch LL. Restricting access to palatable foods affects children's behavioral response, food selection, and intake. *Am J Clin Nutr.* 1999;69:1264–72.
12. Rollins BY, Loken E, Savage JS, Birch LL. Maternal controlling feeding practices and girls' inhibitory control interact to predict changes in BMI and eating in the absence of hunger from 5 to 7 y. *Am J Clin Nutr.* 2014;99:249–57.
13. Gregory JE, Paxton SJ, Brozovic AM. Maternal feeding practices, child eating behaviour and body mass index in preschool-aged children: a prospective analysis. *Int J Behav Nutr Phys Act.* 2010;7:55.
14. Jansen PW, Tharner A, van der Ende J, Wake M, Raat H, Hofman A, et al. Feeding practices and child weight: is the association bidirectional in preschool children? *Am J Clin Nutr.* 2014;100:1329–36.
15. Afonso L, Lopes C, Severo M, Santos S, Real H, Durão C, et al. Bidirectional association between parental child-feeding practices and body mass index at 4 and 7 y of age. *Am J Clin Nutr.* 2016;103:861–7.